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Air heater

Installation Instructions

PLANAR-2D-12/24

PLANAR-4DM2-12/24-P

PLANAR-44D-12/24-GP-P

PLANAR-8DM-12/24-P

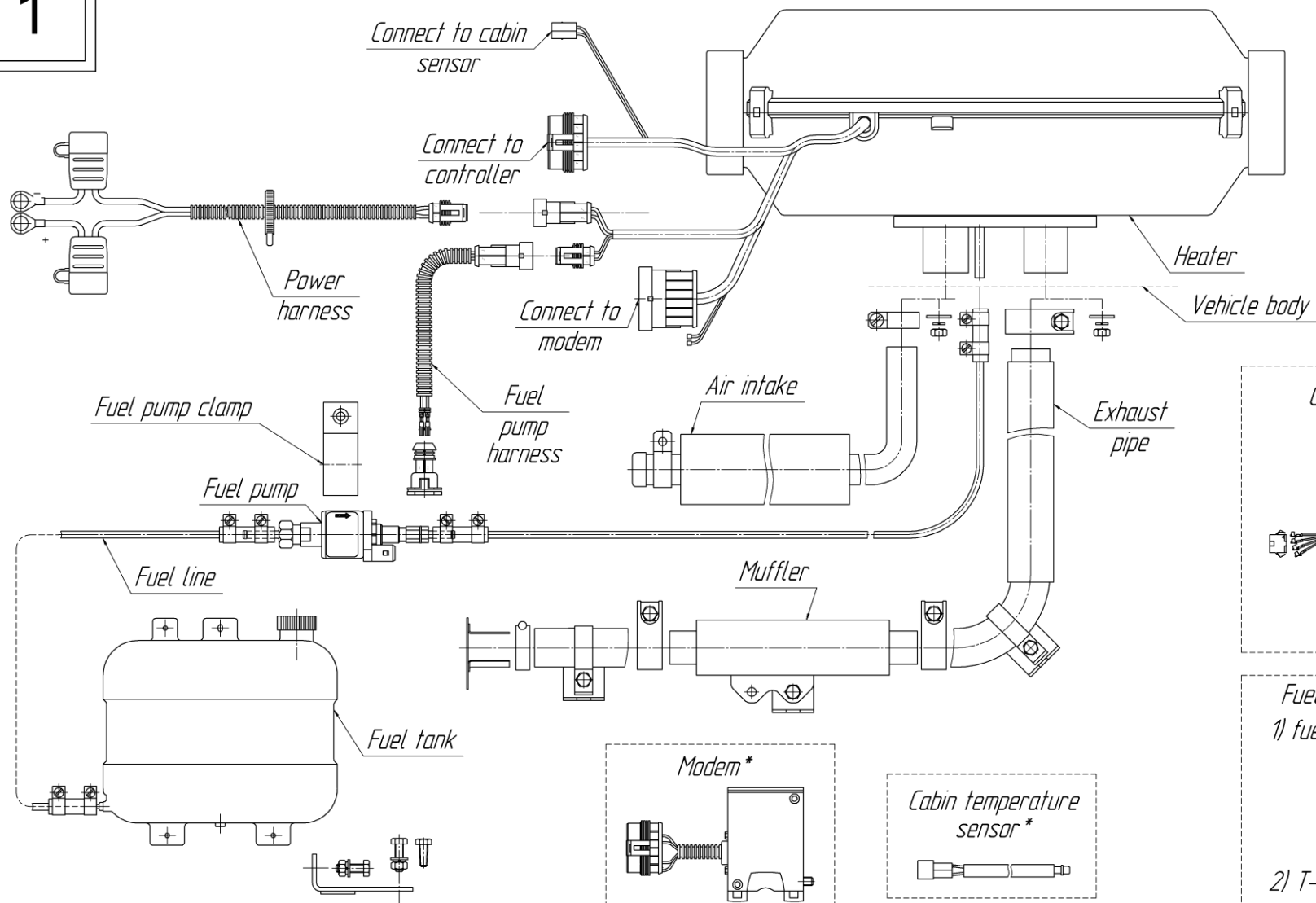


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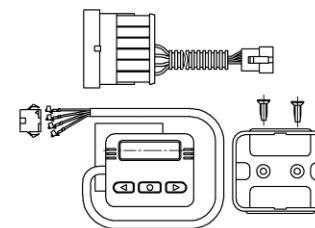
Connections Diagram. Main Parts and units of PLANAR-2D

1

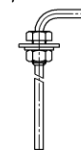


* – not included in standard kit (optional)

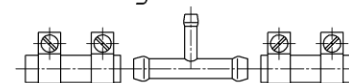
Controller "119-16M"
(with harness)



Fuel supply options
1) fuel pickup

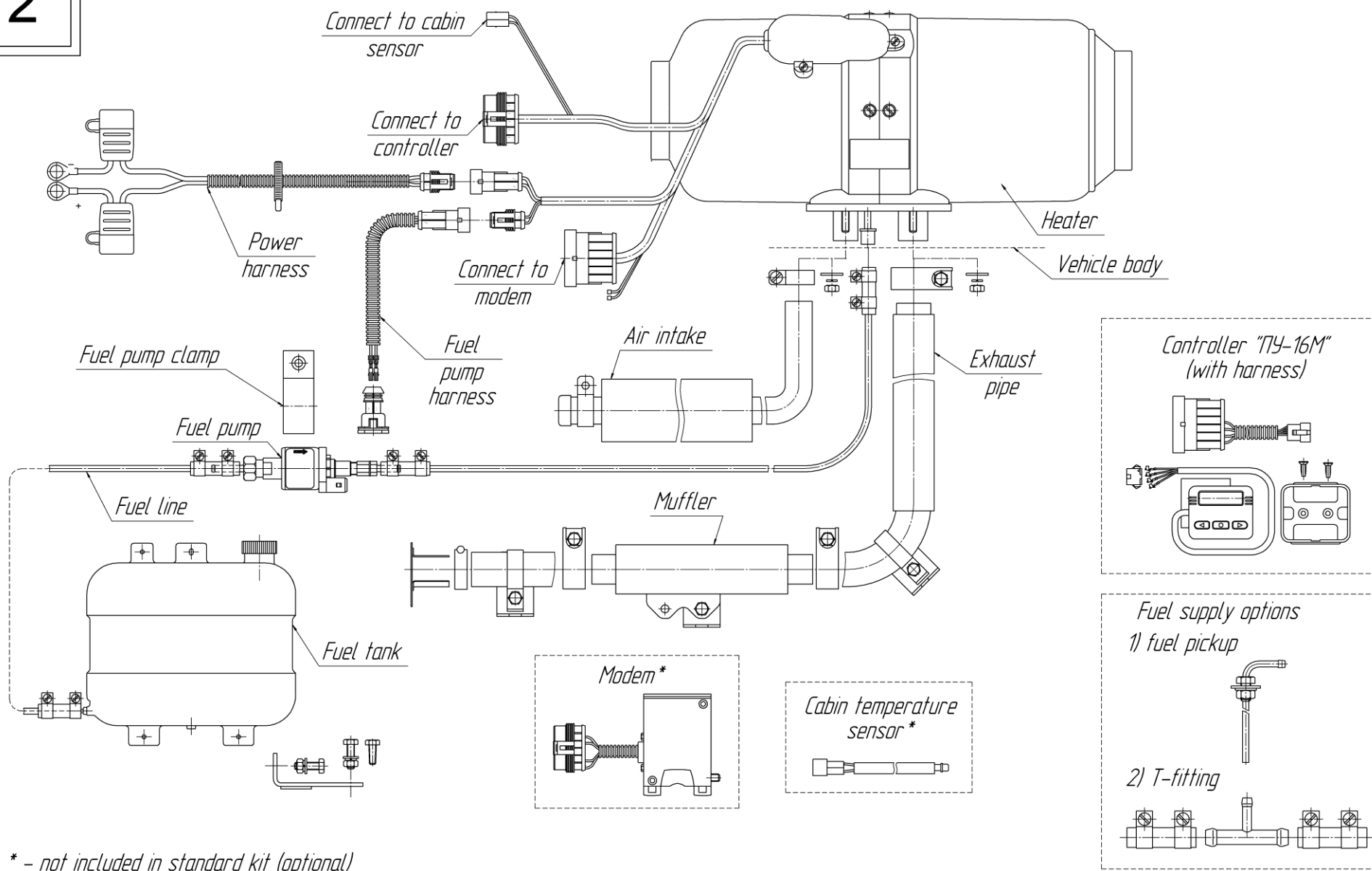


2) T-fitting



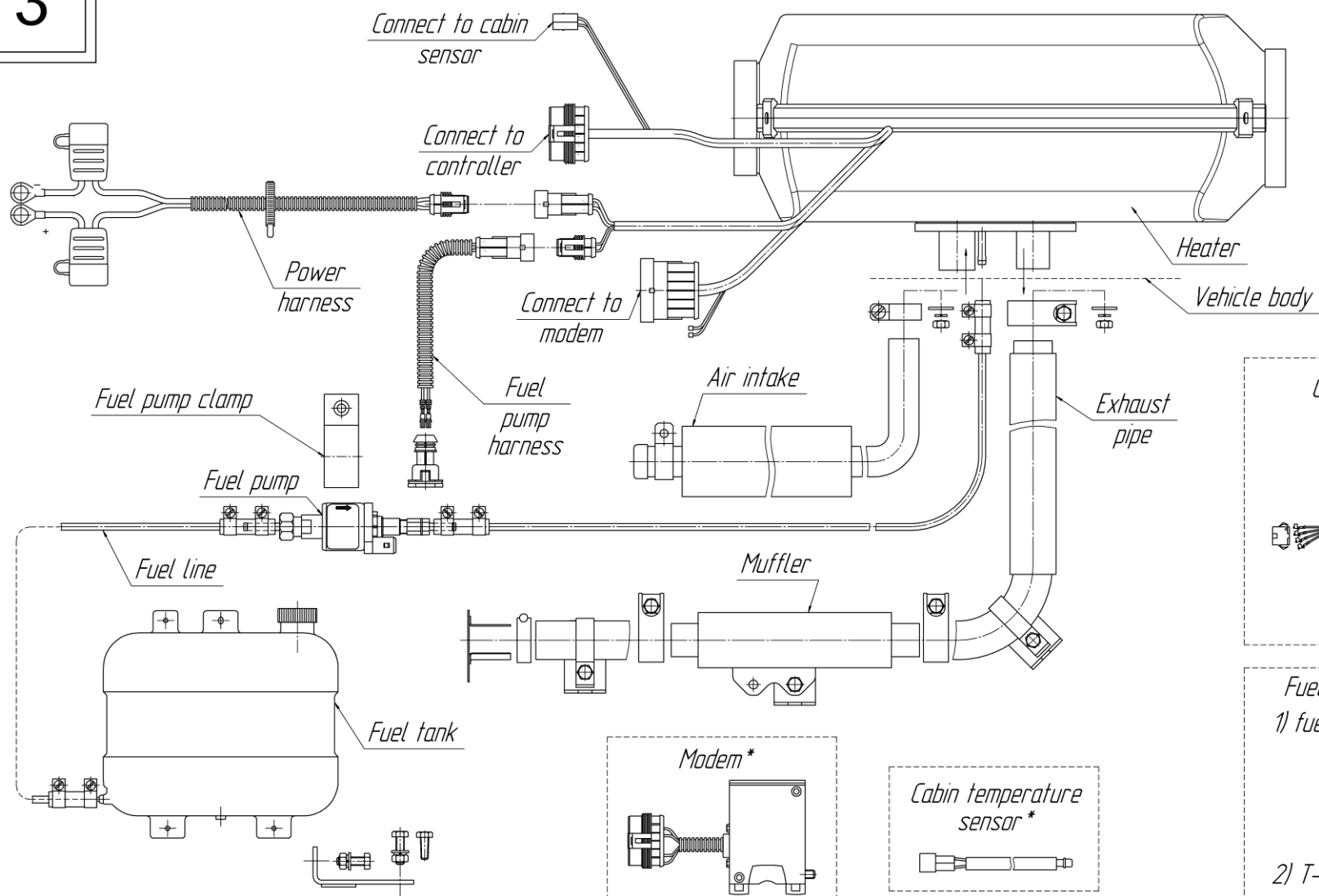
Connections Diagram. Main parts and units of PLANAR-4DM2 mod. P

2

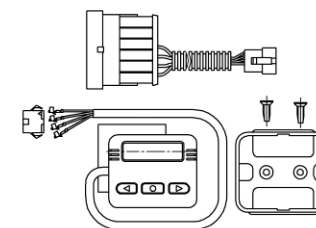


Connections Diagram. Main parts and units of PLANAR-44D mod. P

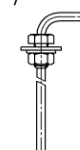
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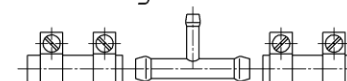
Controller "T19-16M"
(with harness)



Fuel supply options
1) fuel pickup



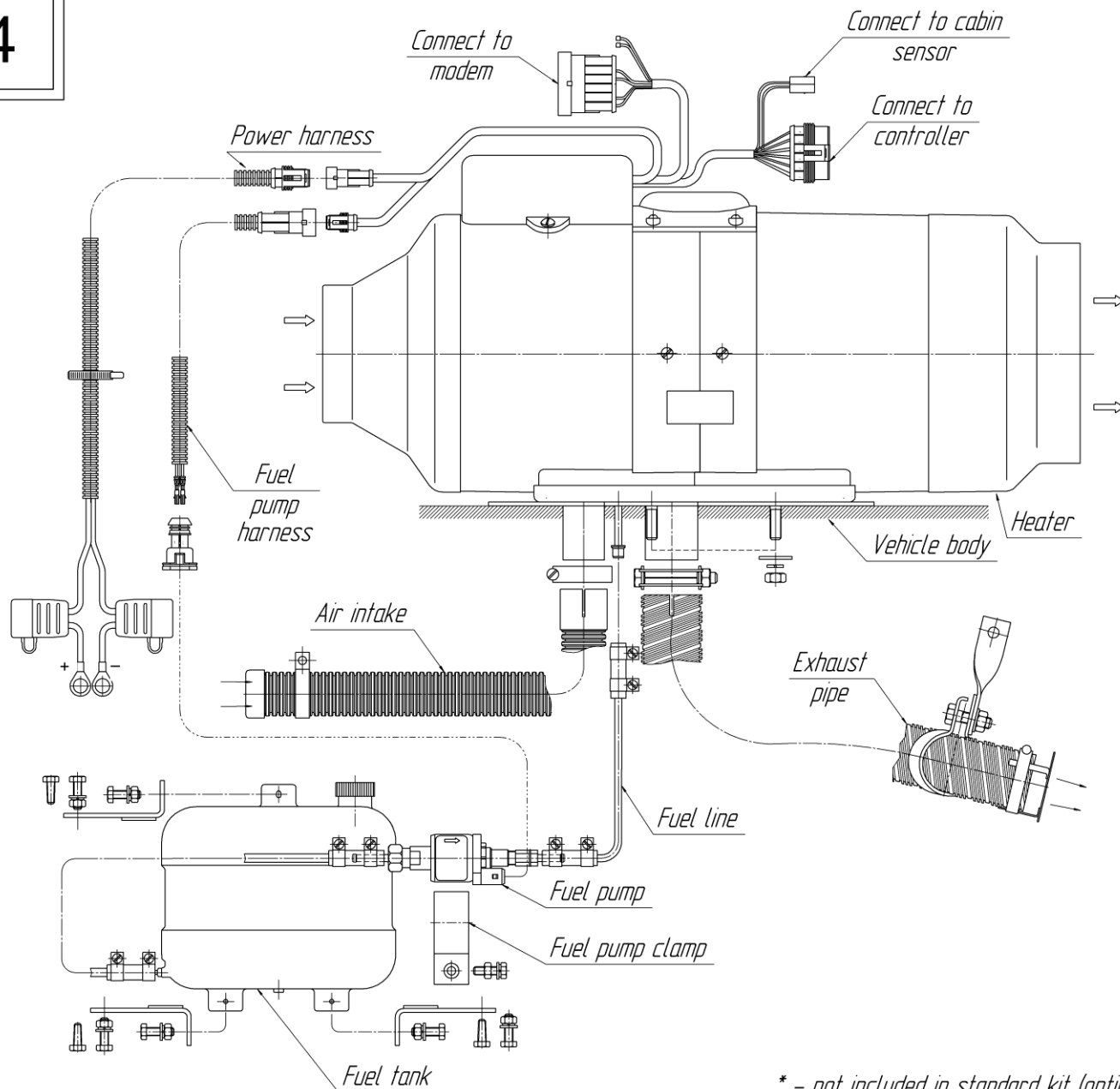
2) T-fitting



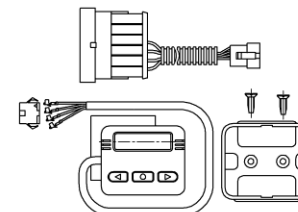
* - not included in standard kit (optional)

Connections Diagram. Main parts and units of PLANAR-8DM mod. P

4

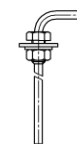


Controller "ПЧ-16М"
(with harness)

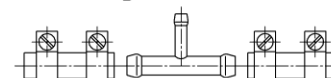


Fuel supply options

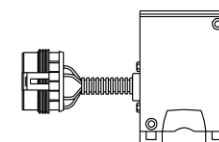
1) fuel pickup



2) T-fitting



Модем*



Кабинный датчик
температуры*



* - not included in standard kit (optional)

Technical Description

Introduction

These Instructions are designed for organizations and users engaged in the installation of PLANAR air heaters. The document describes basic rules of installation of products in heated areas, as well as performance testing of the product after installation. These instructions are used in conjunction with the Operation Manual.



If a fault occurs due to non-compliance with the installation instructions and the information they contain, the manufacturer bears no responsibility therefore. The same applies to the repair specialist who does not have the necessary qualifications, or uses non-original parts without obtaining the permission of the manufacturer.

These installation instructions contain the necessary information and advice on the installation of air heaters PLANAR.

1 Application / modification

Application of air heaters.

Air heaters are designed to heat the driver's cabin or various other interior spaces of limited volume in vehicles at ambient temperatures up to minus 45°C.

Modification

Heaters run on diesel fuel.

Voltage designations in heater labeling:

- «12» designed to operate with power supply voltage of 12V;
- «24» designed to operate with power supply voltage of 24V.

Air heaters are available in different configurations and have the following designations:

PLANAR-2D-12, PLANAR-2D-24

PLANAR-4DM2-12-P-xxxx, PLANAR-4DM2-24-P-xxxx;

PLANAR-44D-12-GP-P-xxxx, PLANAR-44D-24-GP-P-xxxx;

PLANAR-8DM-12-P-xxxx, PLANAR-8DM-24-P-xxxx;

PLANAR-8DM – product designation;

12 or 24 – supply voltage;

P – modification of the heater (modification of control unit);

xxxx – digital designation of the configuration.

2 Safety Instructions



The fuel line shall not be installed inside the cabin of a vehicle.

Wiring (harnesses) shall not be installed near the fuel line.

Vehicle, equipped with a heater, shall have a fire extinguisher.

- When electric welding is carried out on the vehicle, or repair work is made on the heater, the heater shall be disconnected from the battery.
- When mounting and dismounting the heater, follow safety regulations on electrical and fuel systems of the vehicles.
- The heater shall not be connected to the electric circuit of the vehicle with its engine running and no battery installed.



Installation of the heater and its component parts shall be carried out by specialized organizations approved by the manufacturer. Installation of the heater shall be carried out only by specialists in accordance with the installation instructions/

- **Heater power shall not be disconnected until the end of the purge cycle.**
- Power supply of the heater shall be provided for by a **battery only.**
- Connection/disconnection of the heater electrical connectors shall not be made with power ON. After turning off the heater, reconnection should be made at least after 5-10 seconds.

3 Installation



Observe safety requirements during heater installation.

3.1 Mounting Location

The heater can be mounted both inside and outside the vehicle.

For outside mounting the heater should be installed in an area protected from water and dirt. The heater should be mounted in such a way that it is not exposed to water at overcoming water obstacles by the vehicle.

Heater dimensions are shown in Figures 5-8.

3.2 Heater Installation

Mounting positions should be in accordance with those shown in Fig.9-12. The intake of the heater should be positioned in such a way that, under normal operating conditions, exhaust gases of the engine or of the heater could not be sucked into it.

During installation and operation of the heater, intake and outlet of the heater should be protected against foreign objects getting into them.

When installing the air ducts to the heater, they should not have deformations, reducing the flow area of the duct. The maximum length of the output duct should not exceed 5 meters in total.



When mounting the heater, care should be taken to ensure that its housing does not have harmful contact with projecting parts of the floor or other parts of the cabin.



Installation of air ducts to the air heater PLANAR-8DM is forbidden

3.3 Mounting Holes.

For heaters PLANAR-2D, PLANAR-4DM2 and PLANAR-44D, holes in the body of the vehicle should be made as shown in Fig.12. Heater can be installed using mounting brackets, see Fig.11 (in that case, longer studs should be installed in the heater).

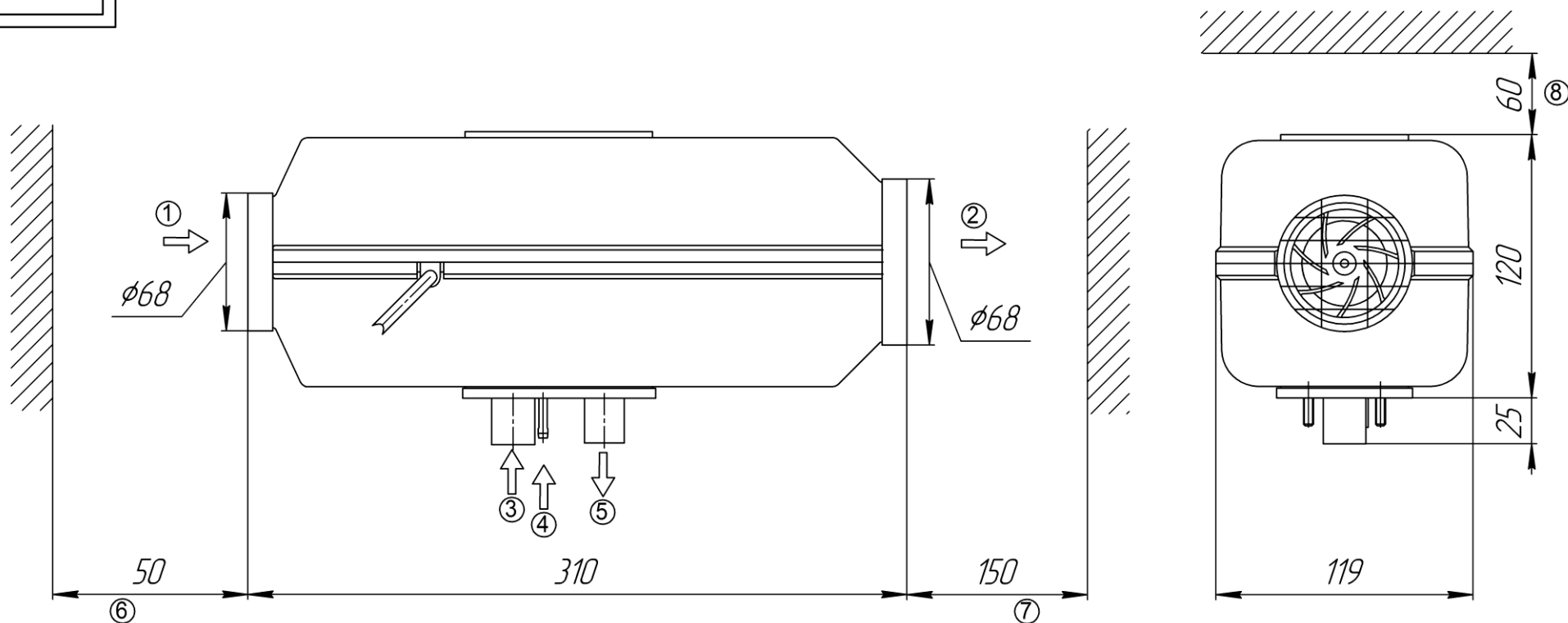
For heaters PLANAR-8DM, holes in the body of the vehicle (with the thickness of the body (floor) of not more than 3mm) should be made as shown in Fig.12.

With the thickness of the vehicle body (floor) of more than 3mm, installation of the heater requires the following:

1. To make a hole in the form of a rectangle with sides of 180 x 95 mm in the body of the vehicle;
2. To attach a mounting bracket to the heater (this bracket can be made of steel sheet at least 2.5mm thick, see Fig.12);
3. To attach the exhaust pipe, air intake, and fuel line to the heater and fasten the whole assembly to the body of the vehicle

PLANAR-2D Heater Dimensions

5

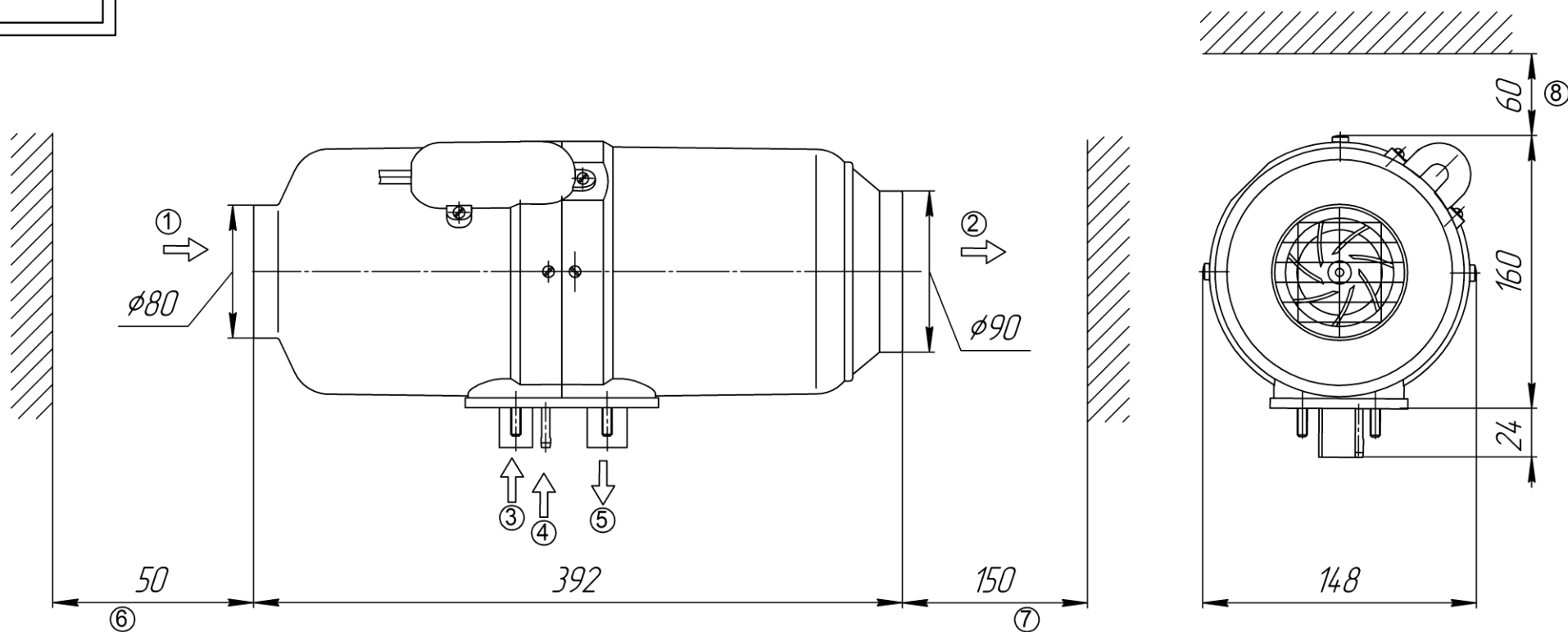


- 1 Heating air intake
- 2 Heating air output
- 3 Combustion air intake
- 4 Fuel supply

- 5 Exhaust gas output
- 6 Required gap before the heating air intake, min. 50mm
- 7 Required gap before the heating air output, min. 150mm
- 8 Required gap for technical maintenance, min. 60mm

PLANAR-4DM2 Heater Dimensions

6

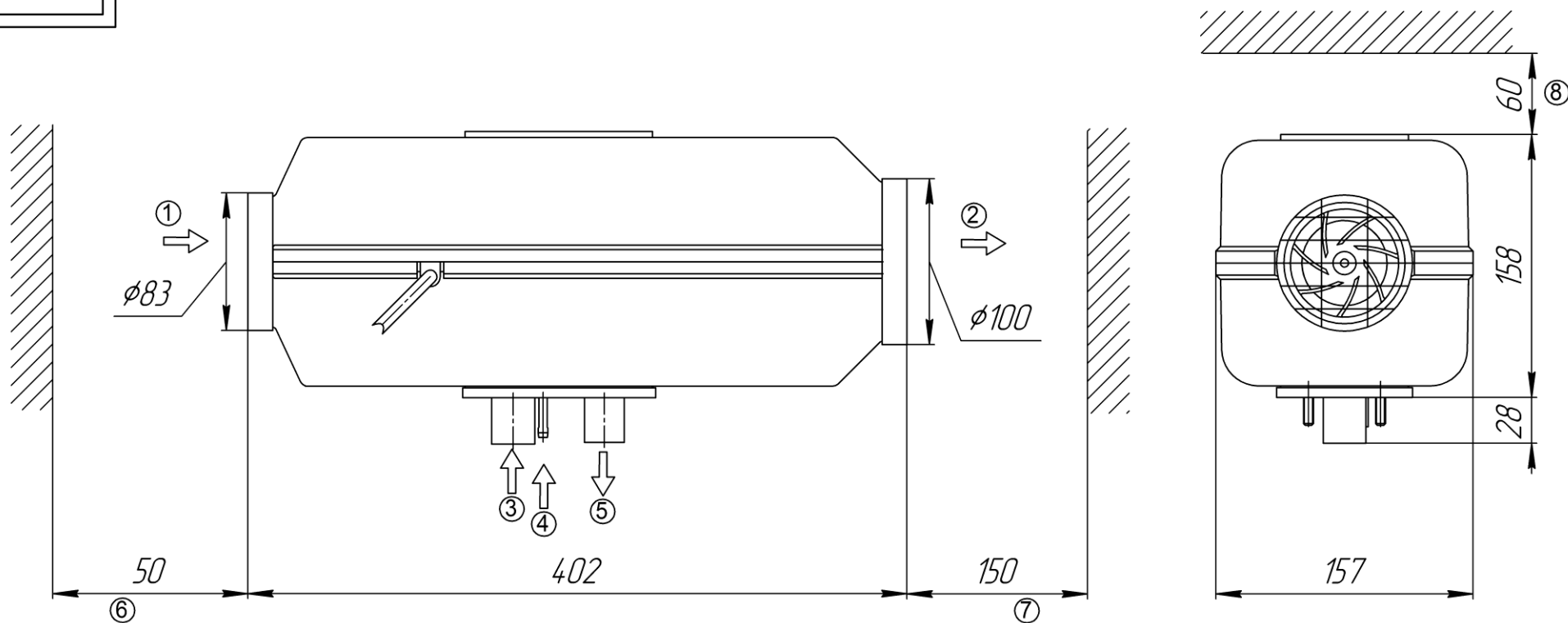


- 1 Heating air intake
- 2 Heating air output
- 3 Combustion air intake
- 4 Fuel supply

- 5 Exhaust gas output
- 6 Required gap before the heating air intake, min. 50mm
- 7 Required gap before the heating air output, min. 150mm
- 8 Required gap for technical maintenance, min. 60mm

PLANAR-44D Heater Dimensions

7

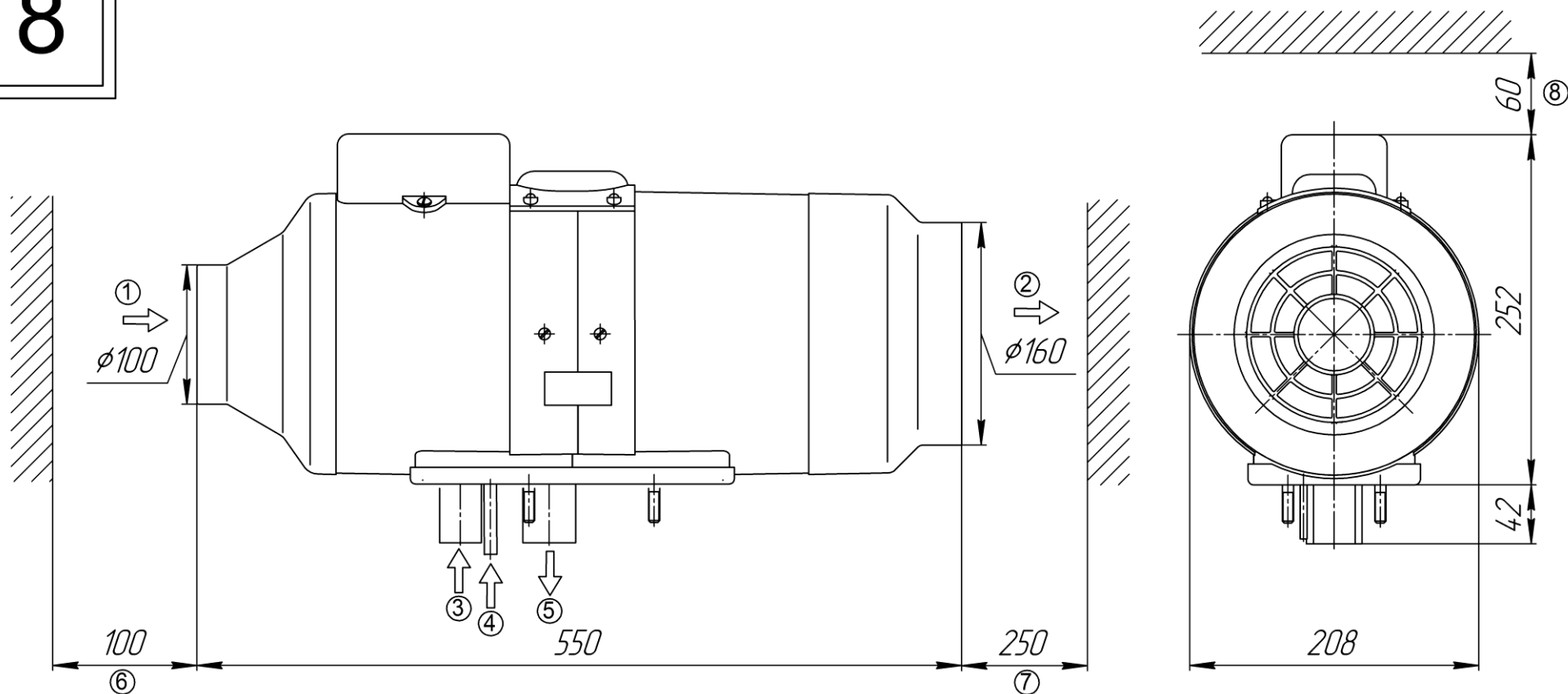


- 1 Heating air intake
- 2 Heating air output
- 3 Combustion air intake
- 4 Fuel supply

- 5 Exhaust gas output
- 6 Required gap before the heating air intake, min. 50mm
- 7 Required gap before the heating air output, min. 150mm
- 8 Required gap for technical maintenance, min. 60mm

PLANAR-8DM Heater Dimensions

8



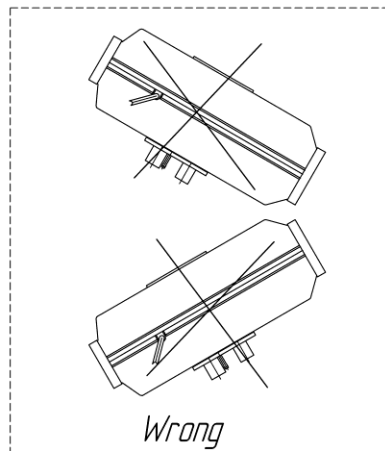
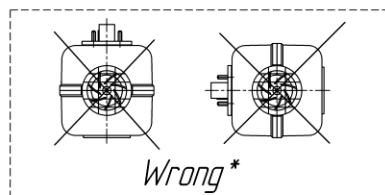
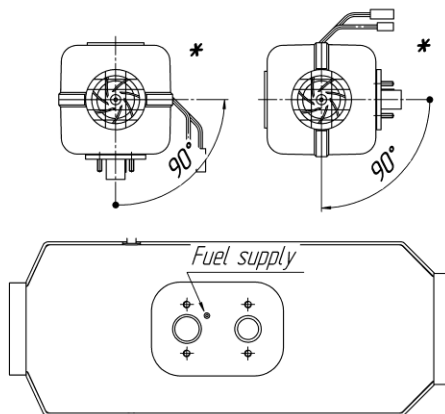
- 1 Heating air intake
- 2 Heating air output
- 3 Combustion air intake
- 4 Fuel supply

- 5 Exhaust gas output
- 6 Required gap before the heating air intake, min. 100mm
- 7 Required gap before the heating air output, min. 250mm
- 8 Required gap for technical maintenance, min. 60mm

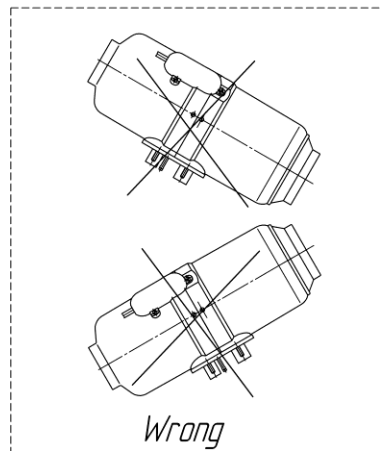
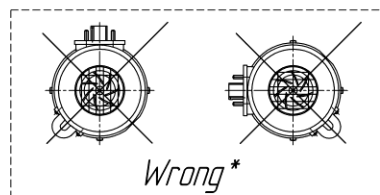
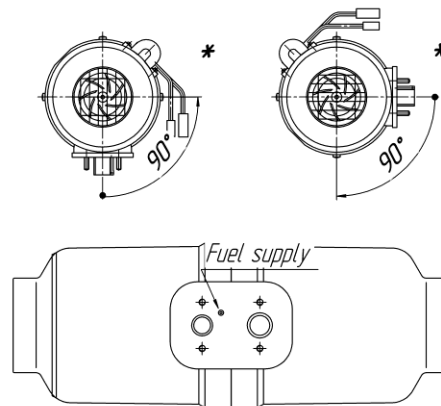
Heater Mounting Position

9

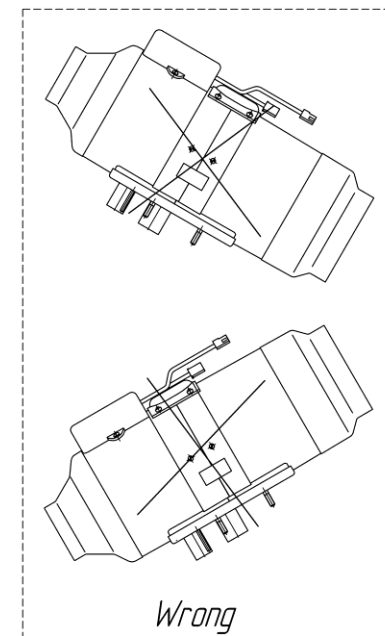
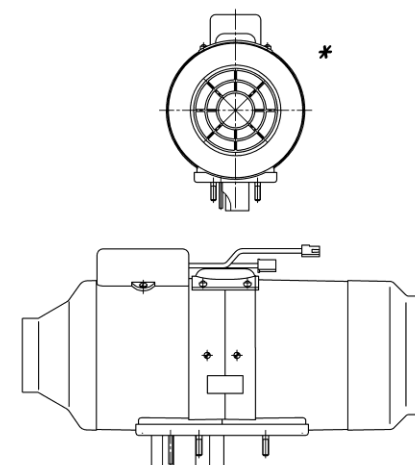
PLANAR-44D
PLANAR-2D



PLANAR-4DM2

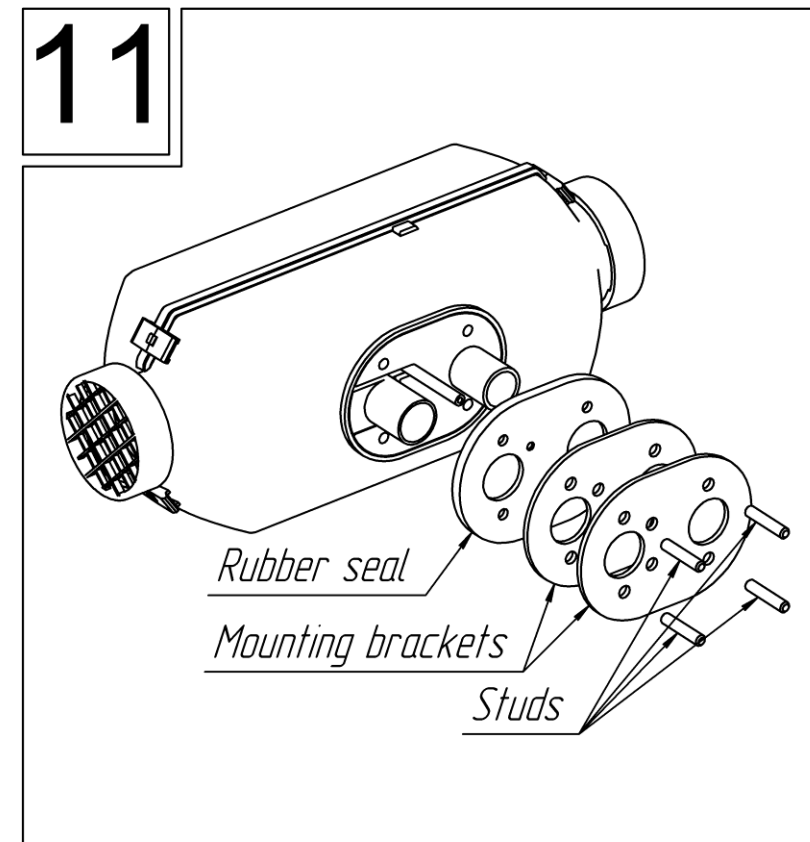
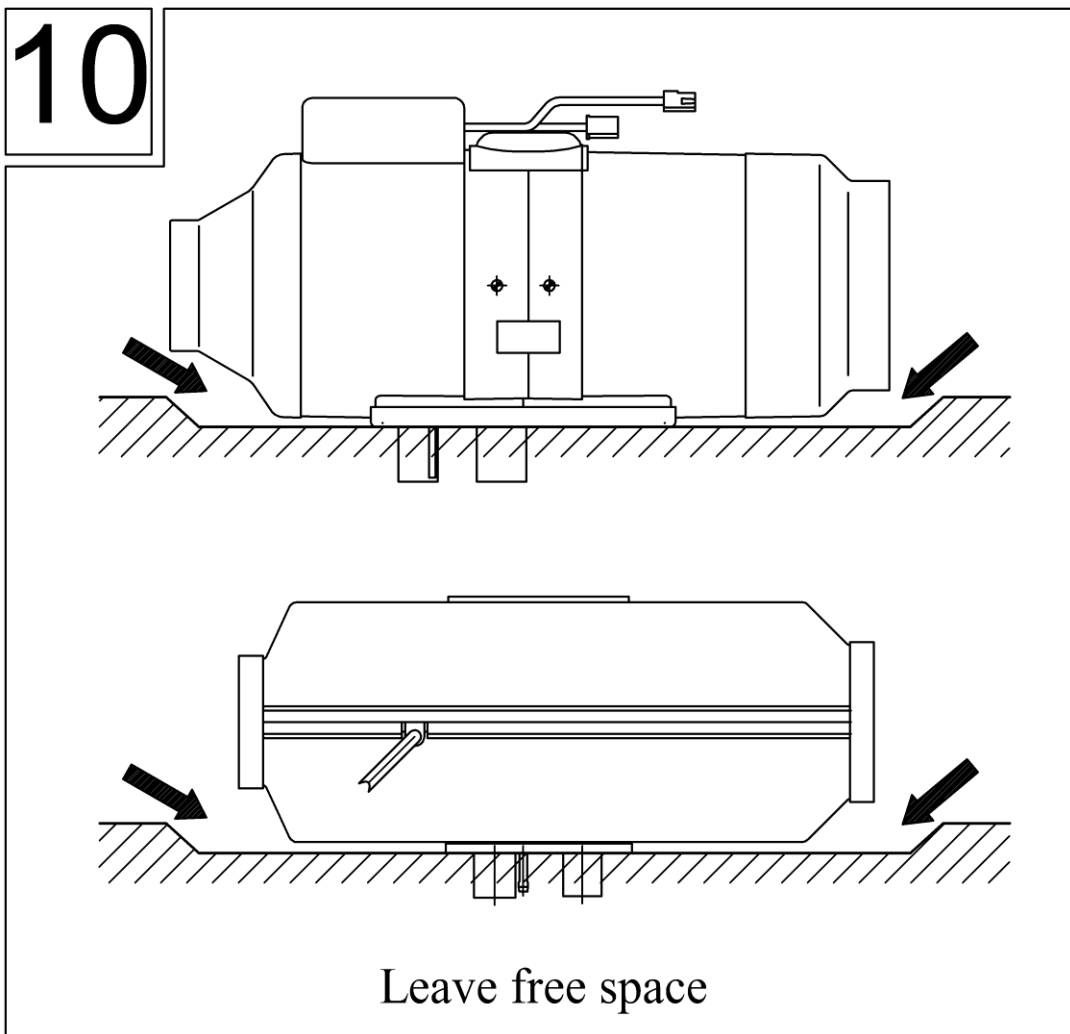


PLANAR-8D



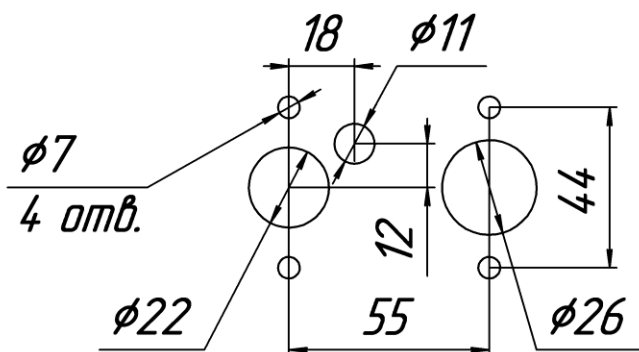
* – view of the heater from the heating air intake side.

Heater Mounting Position

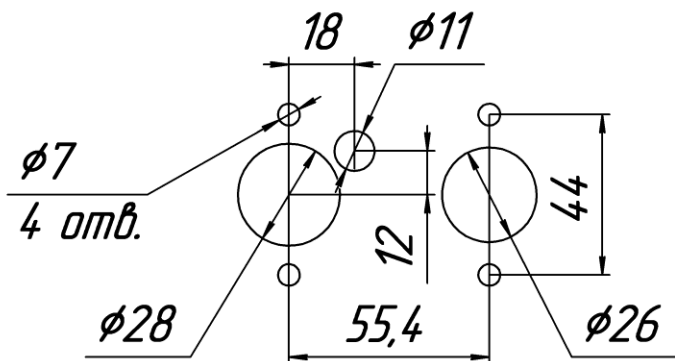


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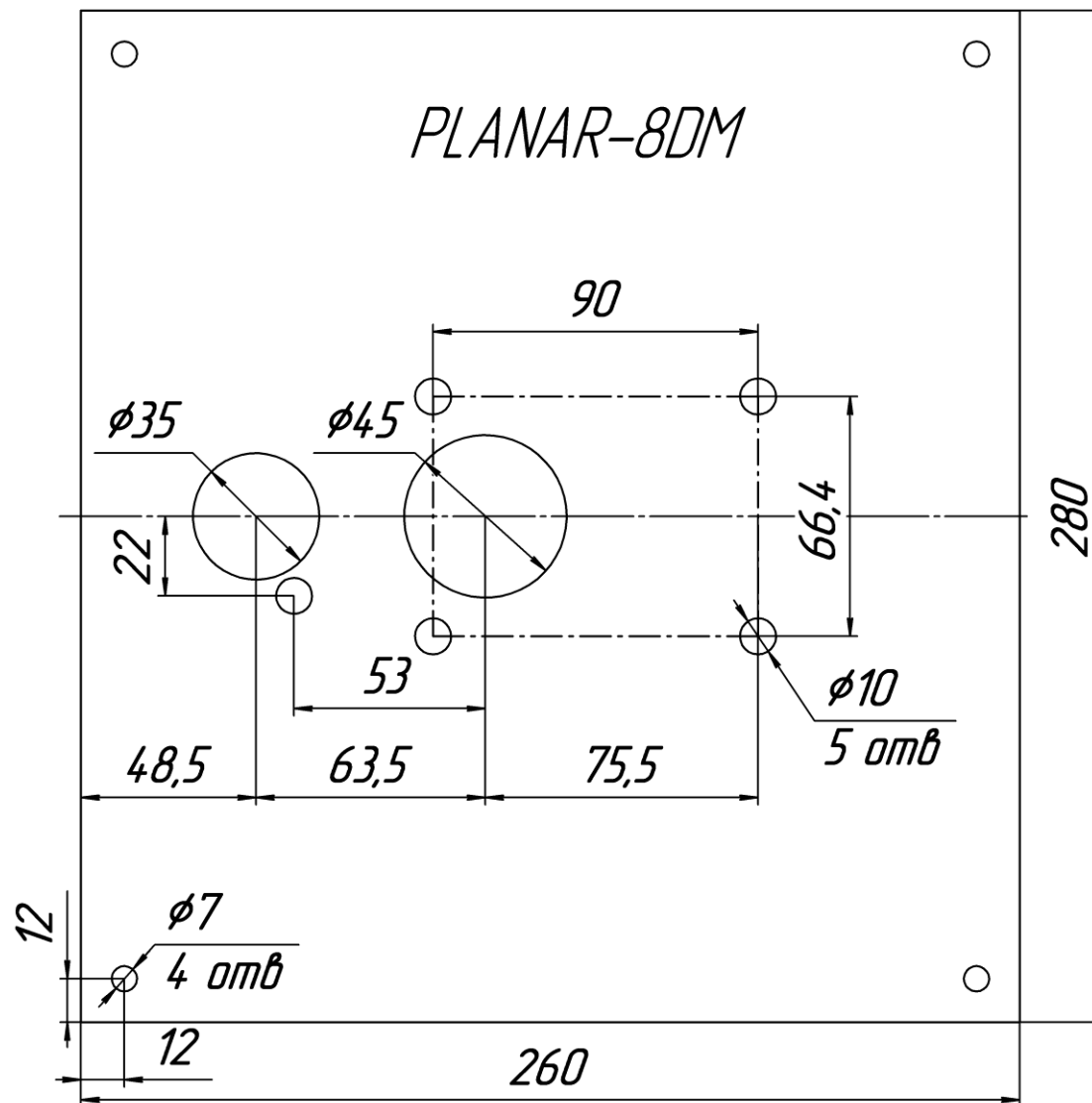
Air flow



PLANAR-44D
PLANAR-2D



PLANAR-4DM2



3.4 Heating Air Supply

Heating air is taken from inside the room or from outside.

Outside air should come from spaces protected from rain, splashes and dirt, it should not be exposed to water when the vehicle is crossing puddle, river, etc.



Hot air outlets should be placed in such a way that air does not come in contact with parts susceptible to damage by high temperature.

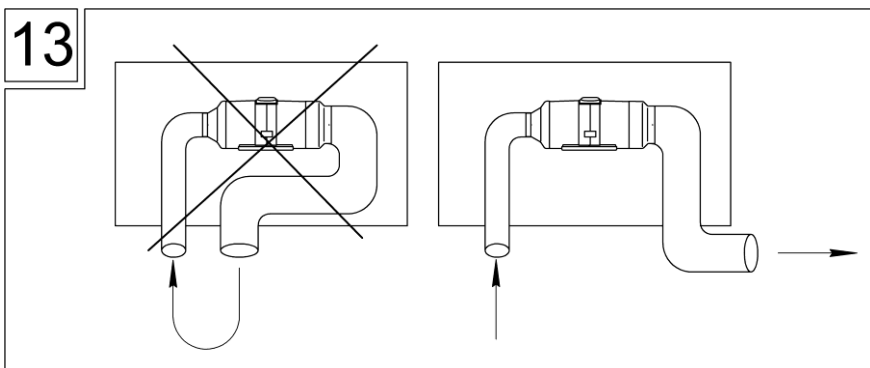


Do not crush or flatten hot air ducting. Duct diameter should be greater than or equal to the diameter of the output fitting of the heater.



Heating ducts should be manufactured only from materials with heat resistance of at least 130°C.

If the heater is operating with air recirculation, avoid sucking the flow of heated air into the air intake heater, Fig.13.



Installation of air ducts to the air heater PLANAR-8DM is forbidden

When using a mounting box, outlet should be sealed in such a manner that the box itself did not get hot air.

3.5 Combustion Air Supply



Air needed for combustion should not be sucked from the cabin or luggage compartment of a vehicle.

Inlet of the intake pipe should be positioned in such a way that it is protected from sucking snow or getting clogged, and if any water gets into it, it should freely drain out.

For boat application combustion air intake should be connected to thru-hull fitting (supplied separately).

3.6 Exhaust System

Exhaust pipe, made from flexible corrugated metal, should be cut to the required length.

The exhaust pipe is attached to the heater with a clamp. For a better contact of the exhaust pipe and the heater fitting, a few cuts of 15-20 mm in length should be made in the pipe, but not beyond the exhaust fitting of the heater.



The end of the exhaust pipe should not touch the rubber sealing of the heater.

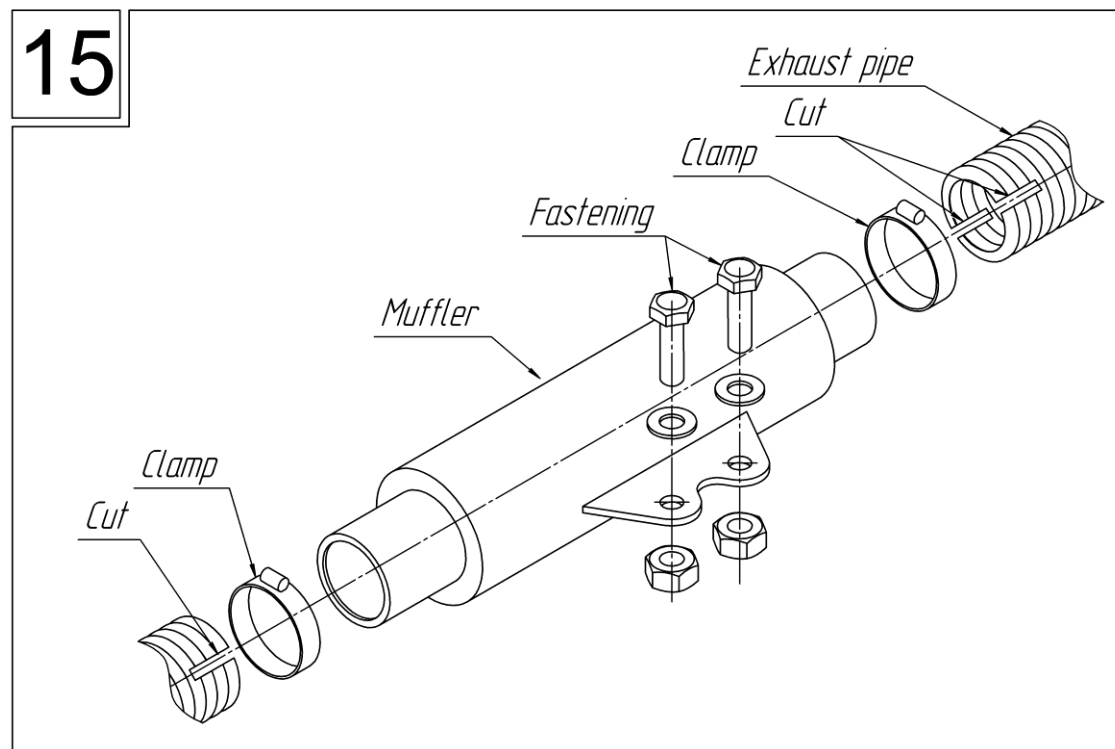
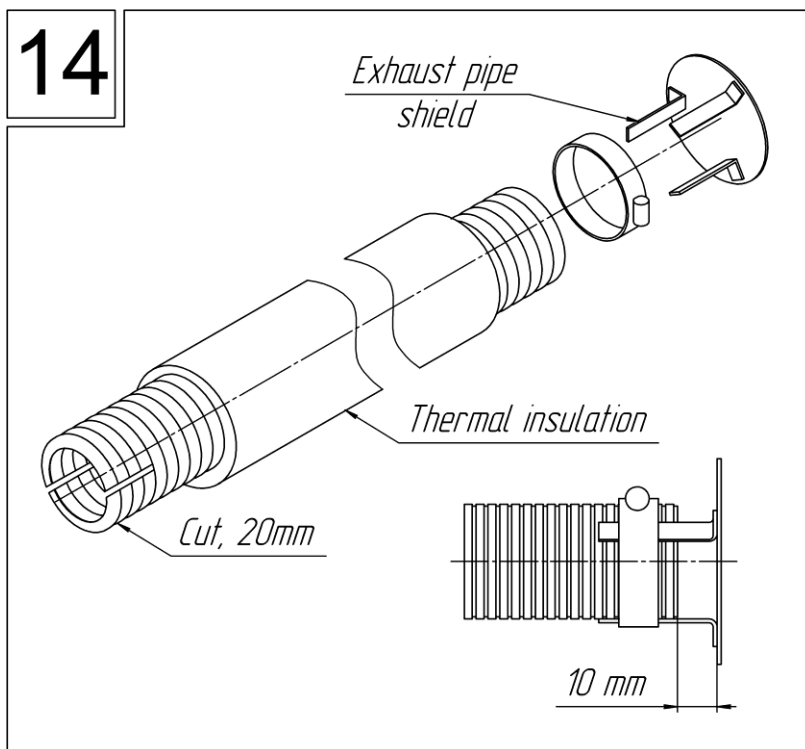


When mounting the exhaust pipe, care should be taken to eliminate penetration of exhaust gases into the cabin or their sucking by the fan through the radiator of the cab heater.



At the end of the exhaust pipe a shield is installed, which necessary for stable operation at low heating modes (Fig.14).

Exhaust gases have to be removed outside of the vehicle



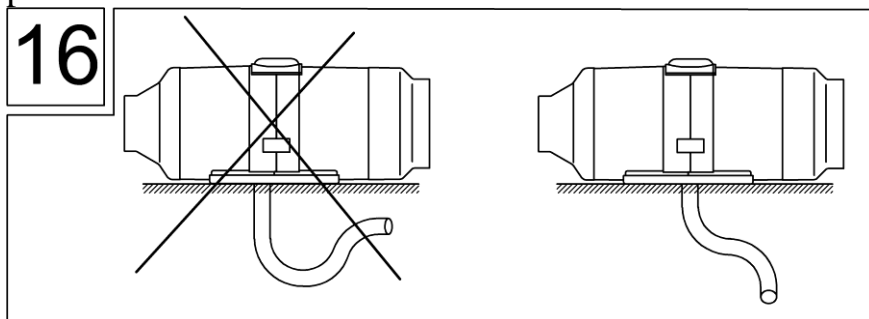
3.7 Installation of Air Intake and Exhaust Pipe

Exhaust gases should be discharged to the outside. Furthermore, the gases should not adversely affect the operation of vehicle units. The outlet of the exhaust pipe should be in such a position that would prevent clogging or entering of snow, and also provide for free drain of any water that got into it.

For boat application exhaust pipe should be connected to exhaust double-wall thru-hull fitting (supplied separately).

Heaters are equipped with a muffler attached to the exhaust pipe. Depending on the mounting location of the muffler, cuts are made to the exhaust pipe. For better fixation of the exhaust pipe on the fittings of the muffler, it is necessary to make cuts 15-20 mm in length, but not extending beyond the male fittings of the muffler. Installation of the muffler is shown in Fig.15.

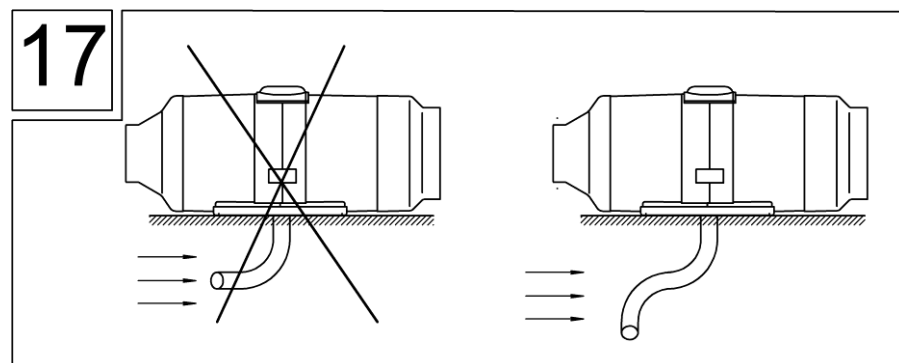
Both exhaust and intake pipes should be positioned inclined downward from the heater (Fig.16). If this is not possible, then a hole Ø3 mm should be made at the lowest point to drain condensate.



Exhaust gas outlet and combustion air inlet should be positioned in such a manner as to eliminate the possibility of re-suction of exhaust gases



The air intake inlet and the outlet of the exhaust pipe shall not face incoming air flow when the vehicle is in motion (Fig.17).



When installing the heater inside van bodies (insulated vans, box vans, etc.), the exhaust pipe outlet and the air intake shall not be placed on the opposite sides of the vehicle (Fig.18).

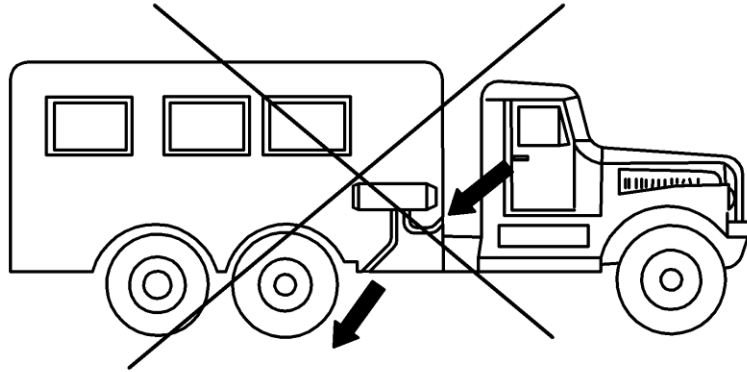
The correct installation of the exhaust and air intake pipes is on one side. The distance between them should exclude re-suction of exhaust gases through the air intake (at least 200mm).

Under adverse conditions (strong wind, occasional atmospheric pressure changes), failure to comply with these recommendations not only prevents the discharge of exhaust gases, but also creates an additional depression near the air intake.

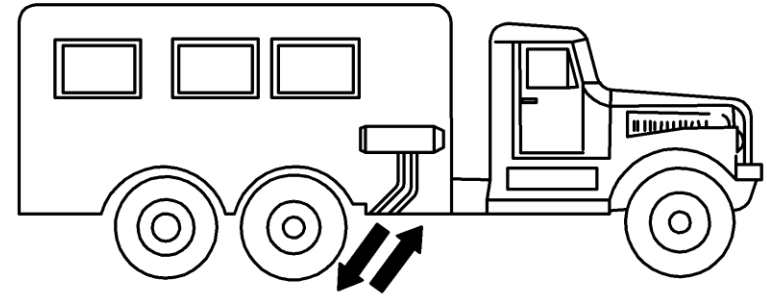
As a result, normal operation of the burner is impeded, it gets clogged with soot, and the life of the heater shortens.

In rare cases, failure to comply with this recommendation may lead to penetration of flame into the air blower.

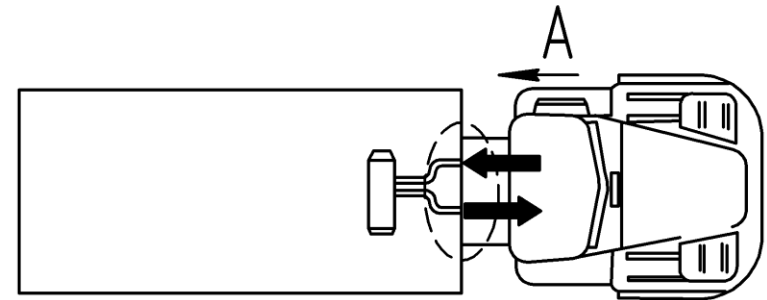
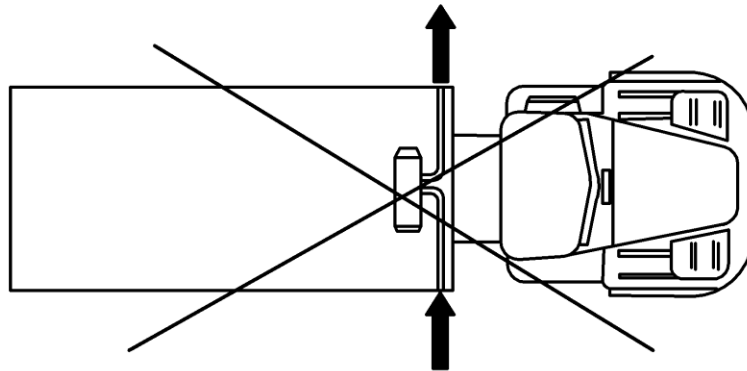
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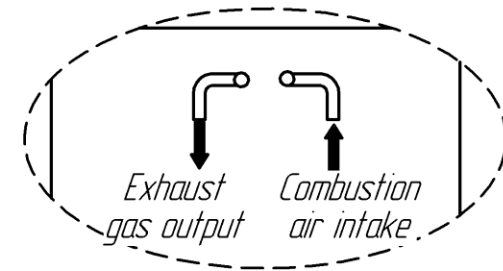
Wrong



Recommended



A



3.8 Insulation

At installation of an exhaust pipe it is necessary to consider its high temperature (to 500 °C, depending on power) at operation.

Certain areas of the vehicle (electrical and other systems) need extra protection from high temperatures. For that reason, the exhaust pipe should be covered with thermal insulation (Fig.14).

3.9 Fuel Supply.



It is forbidden to operate heaters on biofuel.

3.9.1 Fuel Tank Installation

Installation of the fuel tank is shown in Fig.19.



The fuel tank needs to be mounted so that fuel which can be spilled when filling a fuel tank, shouldn't be applied on an exhaust system and an electrical wiring.

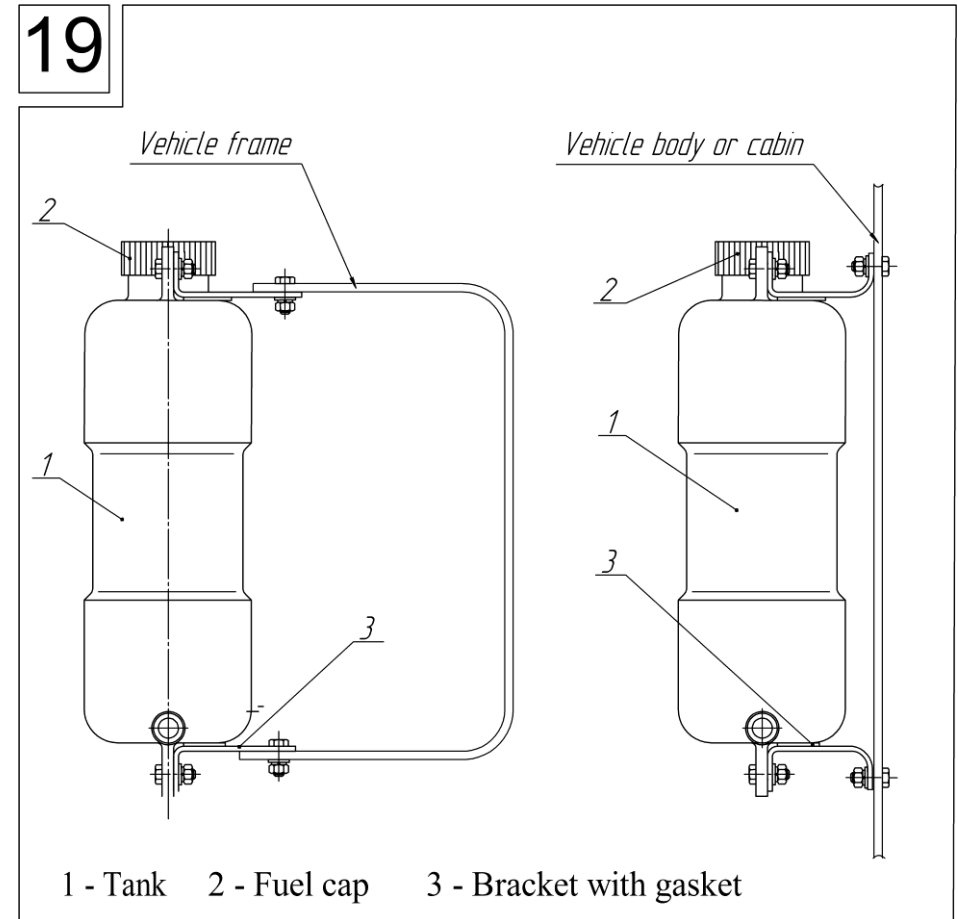


Fuel filler shall not be situated in the passenger compartment, trunk, or engine compartment.

Fuel, which may spill when the fuel tank is being filled, should not get on the exhaust system or electrical wiring.

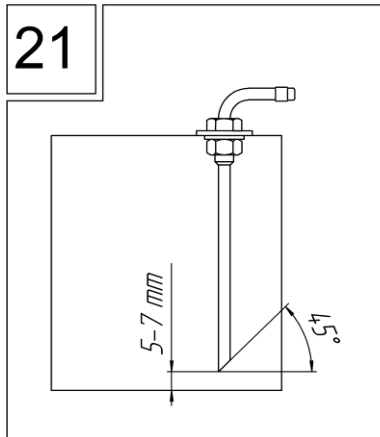
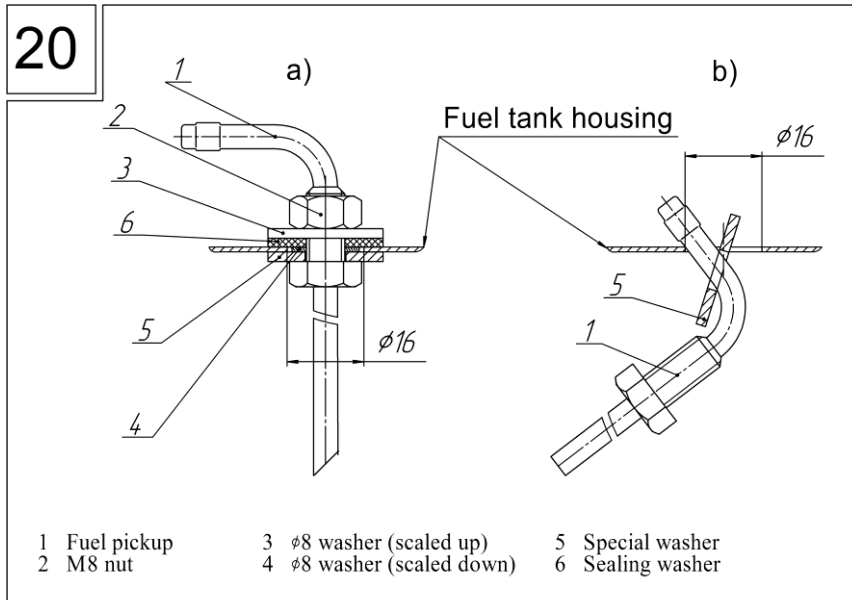
In order to avoid leakage of fuel from the fuel tank (by gravity) when the fuel pump loses its tightness, the fuel tank should be preferably placed in such a way that the maximum fuel level is below the cut-off plane of the fuel tube of the heater.

19



3.9.2. Fuel Pickup Installation

Fuel pickup is mounted on the fuel tank as shown in Fig.20(a). Fig.20(b) shows installation of a special washer with the fuel pickup in the fuel tank hole. Before installation, the fuel pickup should be cut to the required length at 45 ° Fig.21).



3.9.3 Fuel Pump Installation

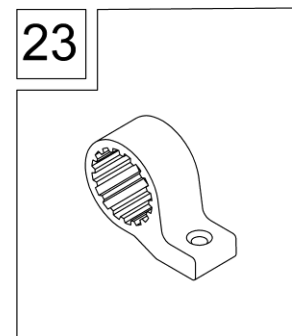
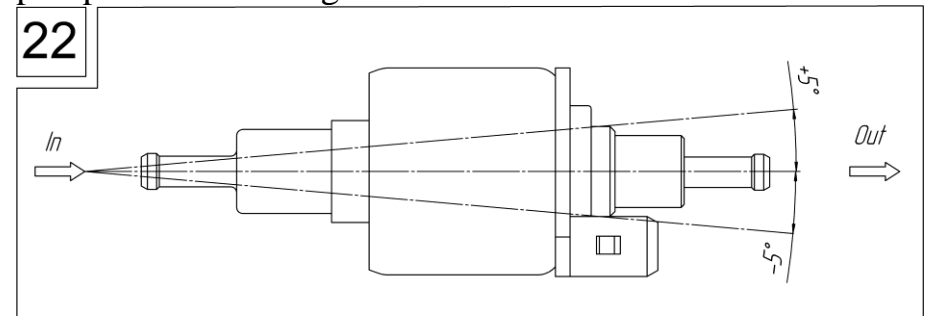
The fuel pump is used for metered supply of fuel into the combustion chamber.

The fuel pump is operated by electrical impulses sent by the control unit. The pulse frequency corresponds to the certain performance of the heater.

The fuel pump is mounted on a rubber cushion clamp (Fig. 23).

The fuel pump is preferably mounted closer to the fuel tank and below the lower fuel level in the fuel tank.

Heaters are equipped with fuel pumps manufactured by Thomas Magnete. The correct mounting position of the fuel pump is shown in Fig.22



3.9.4 Fuel Line Installation.

Installation of the fuel line between the fuel pickup and the heater is shown in Fig.24. Sections of the fuel line are connected by means of couplings.

If couplings are not cut off and are delivered as one rubber sleeve, it is necessary to cut it into appr. lengths of 50-70mm.

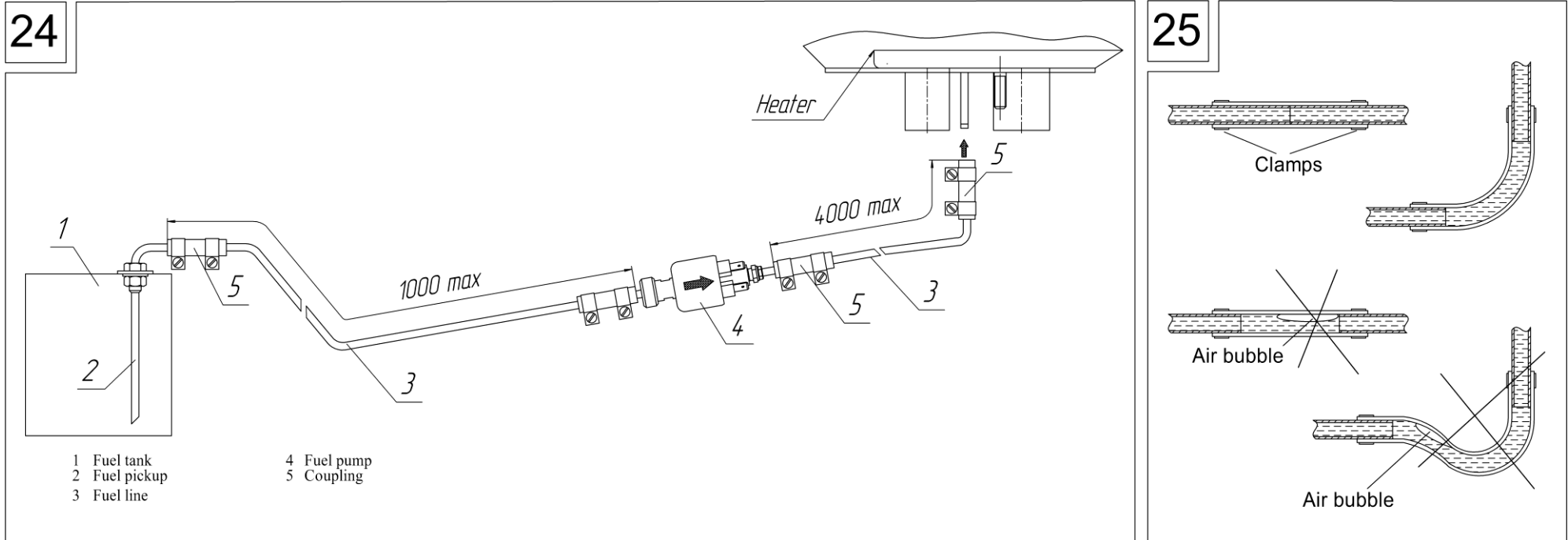
Proper connection of two fuel tubes with a coupling is shown in Fig. 25.



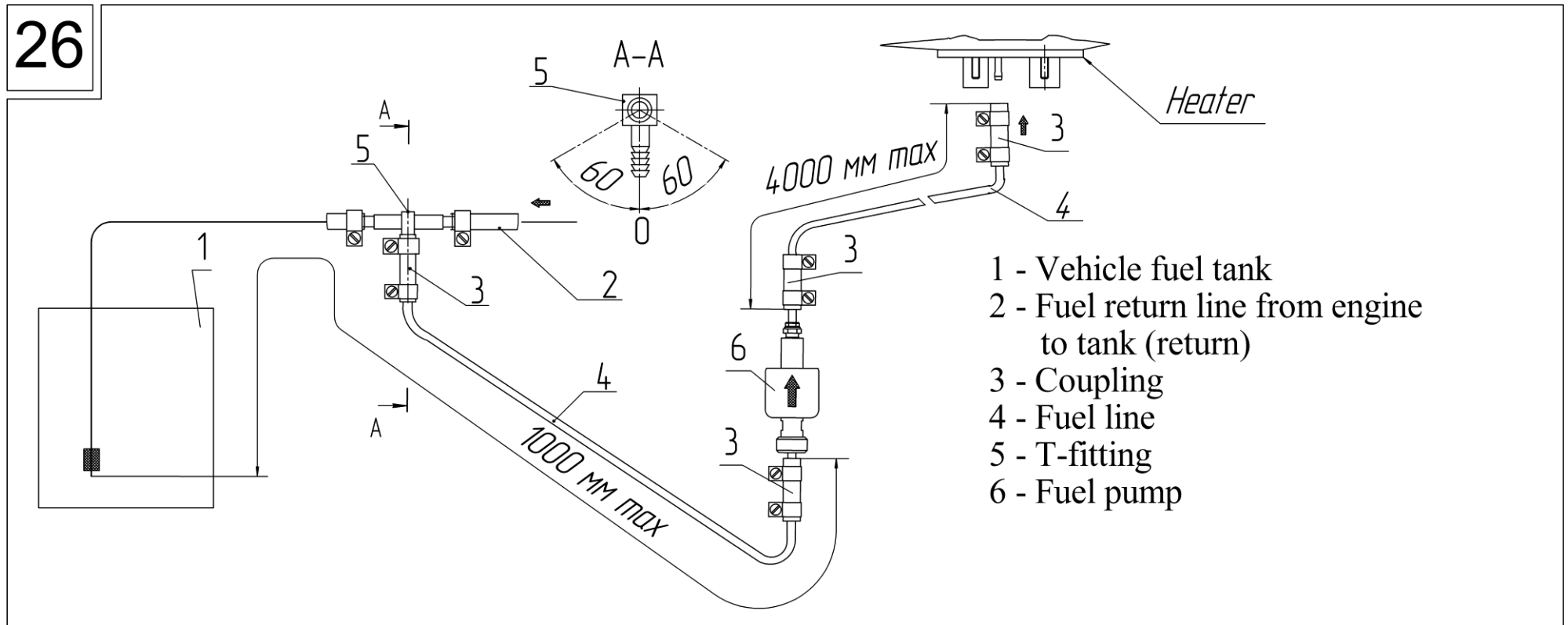
Cutting of couplings and fuel tubes should be done only with a sharp knife. Interfaces shall not be crushed and must be free of burrs or narrowing of the flow cross section.

3.9.5 Heater Fuel Intake with T-Fitting.

Fuel intake from fuel return line from engine to the fuel tank can be carried out using a T-fitting. The fuel return line must be with no pressure with its end at the bottom of the fuel tank. Fig. 26 shows installation of the T-fitting.



26



3.9.6 Heater Electrical Wiring Installation.

Installation of wire harnesses and other electrical parts of the heater should be made according to the wiring diagram. The possibility of heating, deformation and movement of harnesses during operation of the vehicle must be eliminated. Harnesses are fastened to elements of the vehicle with plastic clips.

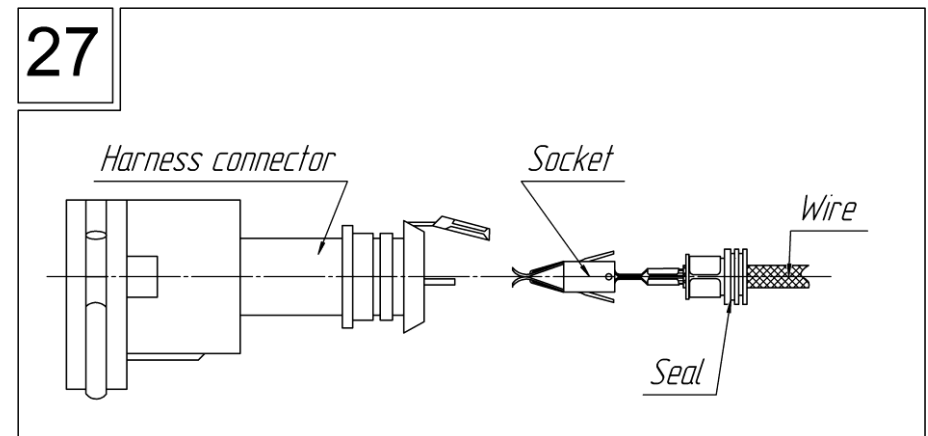
Attention! Mounting shall be carried out with the fuse removed.



If the length of the fuel pump wiring harness needs to be shortened, it is allowed to remove an unnecessary portion from the middle of the harness. The splice should be insulated.

Installation of the fuel pump electrical harness connector is shown in Fig.27.

27

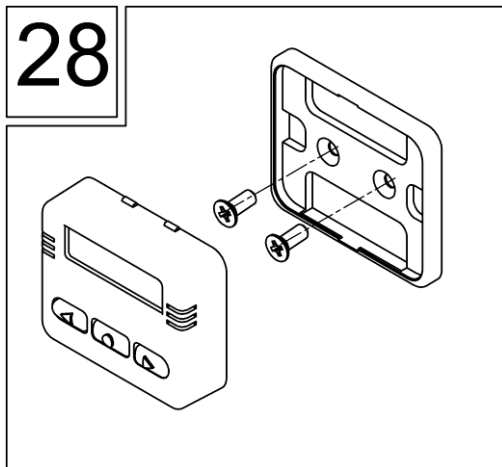


3.9.7 Controller Installation

Controller is mounted in any place convenient for the driver (personnel). The Controller is mounted by means either of double-sided tape or a bracket:

- double-sided tape, attached to the rear surface of the Controller. The connecting wire can be led out of the Controller housing through the back cover, or through the side surface of the housing, by removing the partition. Before installing the Controller, first degrease the installation surface, then remove protective film from the adhesive tape, and attach the Controller to the prepared surface.

- bracket (Fig.28), fastened to the panel with screws. The wire is led out of the Controller housing through the back cover. The Controller snaps to the bracket with an audible click.

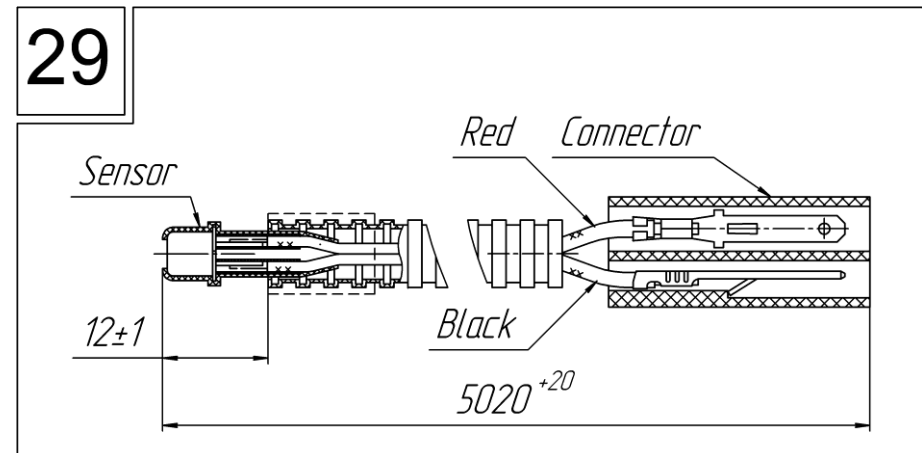


3.9.8 Cab Sensor Installation

Cabin sensor (Fig.29) is designed to measure air temperature in the area of its installation, which allows to maintain there the desired temperature. The maximum length of the cabin sensor cable is 5000mm. The sensor is mounted in a convenient for the driver (personnel) place. The temperature sensor should be installed at medium height on the vertical surface in a heated area.

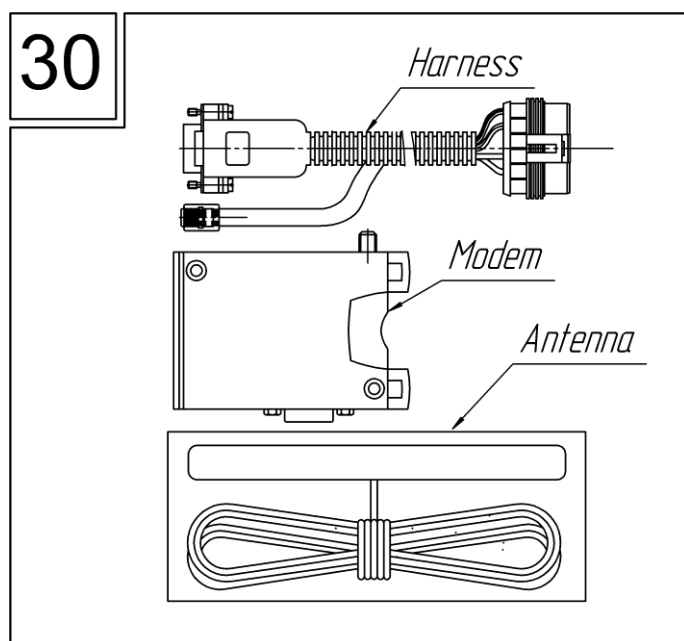
The temperature sensor should not:

- Be located directly in the stream of heated air (from the vehicle heating system or the heater itself);
- Be close to heat sources;
- Be exposed to direct sunlight
- Be covered with cloth or the like



3.9.9 Modem Installation

GSM modem (Fig.30), which in essence is an analog of cell phone without display and keyboard, is designed for use in harsh environments (cold, vibration, etc.). The modem, same as a cell phone, has a SIM card installed, i.e. the heater acquires a full telephone number of your chosen service provider. The modem can be installed in any convenient, clean place. For more details about the modem see Instructions to the modem.



* - optional.

4 Checking the Heater after Installation

After installation of the heater it is necessary to check that all wires, clamps and electric connectors established and fixed well. Fill the fuel-supply line completely and remove the air from it.



The fuel-supply line can be filled in two ways:

- 1) to start a heater several times. Time of one full start - 5 minutes.
- 2) to use the fuel pumping device*

Control of filling of the fuel-supply line is exercised visually, through transparent tubes of a fuel-supply line.

Connect of a heater to the electrical supply and install fuses on a harness of a heater.

During the first start it is necessary to check tightness of all connectors and durability of their fastening. If necessary, tighten the clamps.

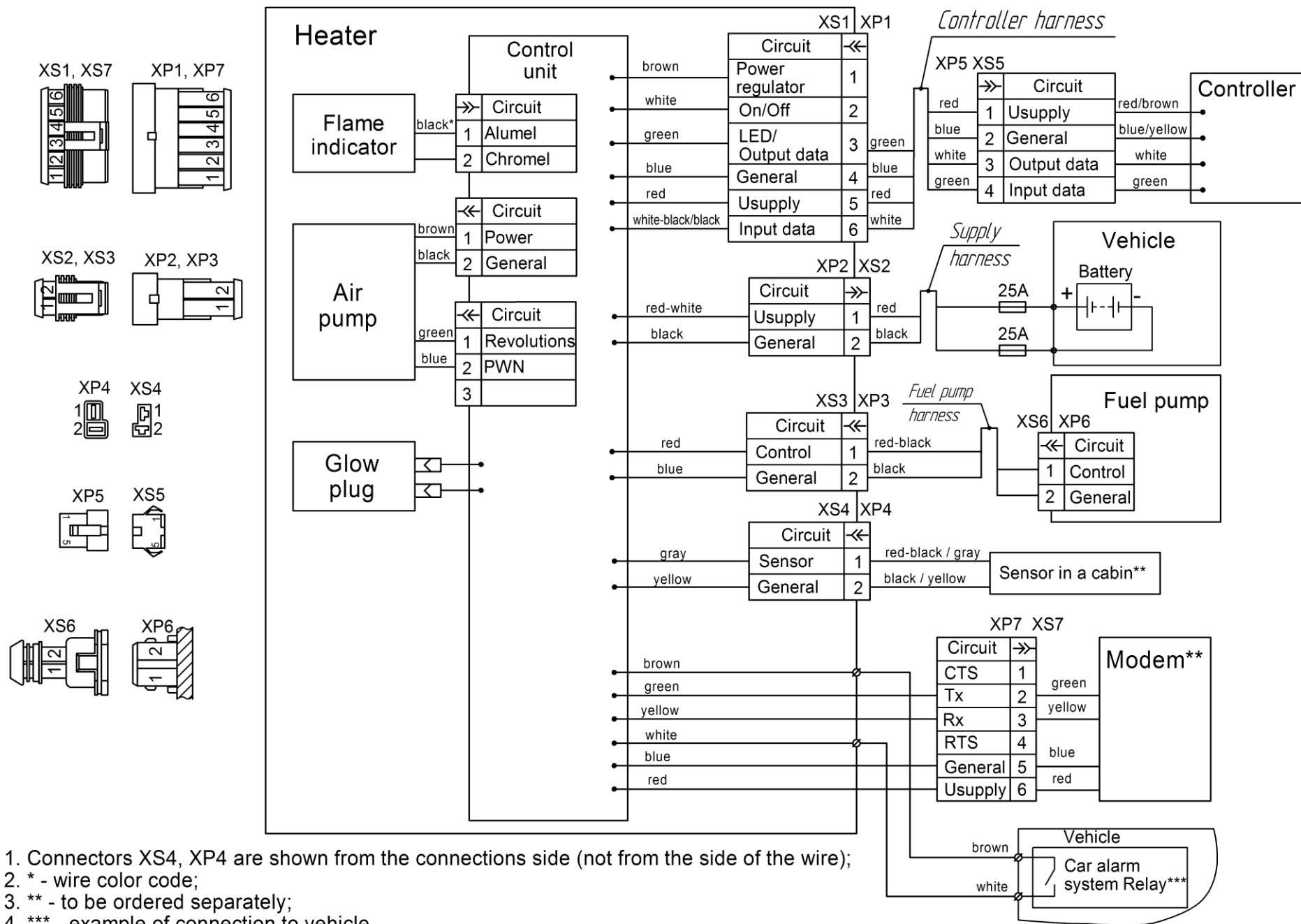
At the first start perhaps small smoking from an exhaust pipe.

5 Recommendations

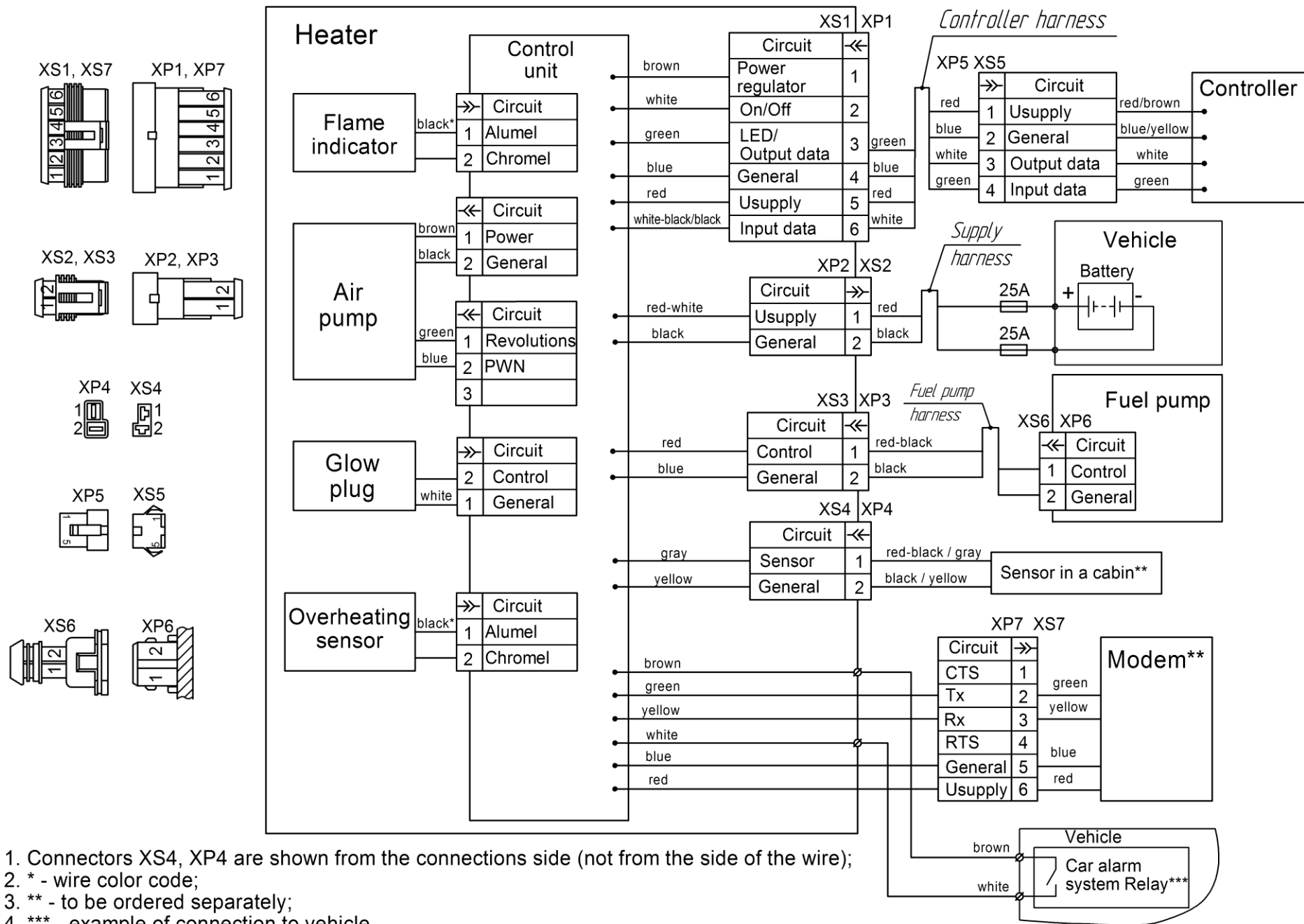
If the heater does not start after switching on, make sure there is fuel in the tank, check the charge of the battery, check if connectors are properly connected and if the 25A fuses are good.

If you are unable to determine the cause of the fault, please contact your local dealer, or visit www.autoterm.ru.

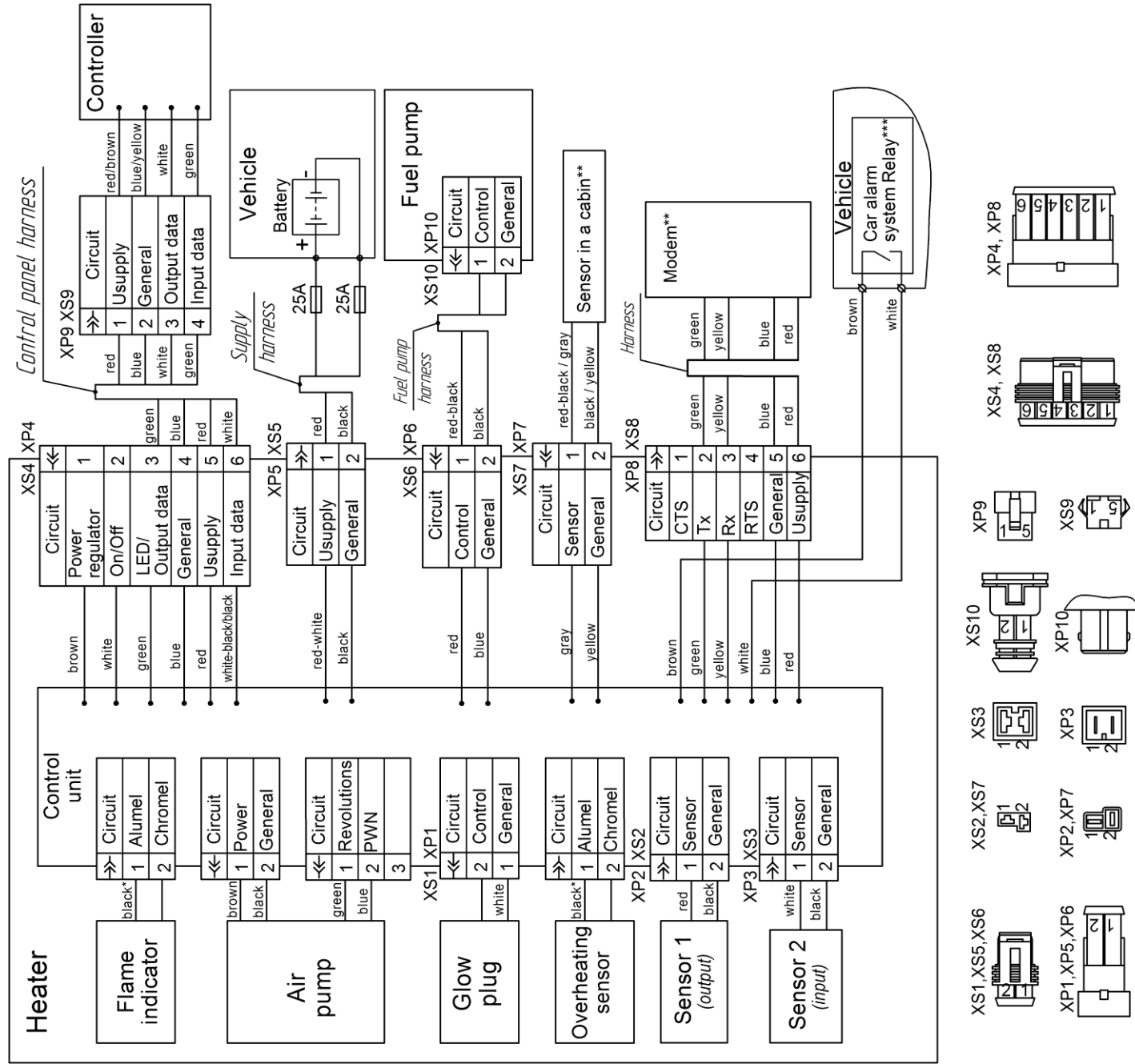
PLANAR-2D Electrical Wiring Diagram



Electrical Wiring Diagram PLANAR-44D и PLANAR-4DM2 mod «P»



Electrical Wiring Diagram PLANAR-8DM mod «P»



1. Connectors XS2, XS3, XS7, XP2, XP3, XP7 are shown from the connections side (not from the side of the wire);
2. * - wire color code;
3. ** - to be ordered separately;
4. *** - example of connection to vehicle.